

APPENDIX F-2.

Interaction Tables for the Neoplasia Assessment

This appendix contains exposure analyses results of interactions between covariates and group or dioxin. Results are presented for separate strata of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values for discrete dependent variables. Sample sizes, adjusted means, differences of adjusted means and confidence intervals or adjusted slopes and standard errors, and p-values are given for continuous dependent variables. Means are transformed back to the original scale, if necessary. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The covariate involved in the interaction and a reference to the analysis table in Chapter 10, Neoplasia Assessment, are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix F-2 Table	Chapter 10 Table	Dependent Variable	Model	Covariate
F-2-1	10-3	Any Skin Neoplasms	5	Skin Color, Industrial Chemical Exposure
			6	Skin Color, Industrial Chemical Exposure
F-2-2	10-4	Malignant Skin Neoplasms	2	Insecticide Exposure
			3	Industrial Chemical Exposure, Insecticide Exposure
F-2-3	10-5	Benign Skin Neoplasms	5	Skin Color
			6	Skin Color
F-2-4	10-7	Basal Cell Carcinoma (All Sites Combined)	6	Asbestos Exposure
F-2-5	10-9	Basal Cell Carcinoma (Trunk)	3	Insecticide Exposure
			4	Insecticide Exposure
			5	Insecticide Exposure
			6	Insecticide Exposure
F-2-6	10-13	Nonmelanoma	2	Insecticide Exposure
F-2-7	10-16	Malignant Systemic Neoplasms	2	Lifetime Cigarette Smoking History
			4	Degreasing Chemical Exposure
			5	Lifetime Cigarette Smoking History, Degreasing Chemical Exposure
			6	Lifetime Cigarette Smoking History, Degreasing Chemical Exposure
F-2-8	10-18	Systemic Neoplasms of Uncertain Behavior or Unspecified Nature	4	Asbestos Exposure
			5	Asbestos Exposure
			6	Asbestos Exposure
F-2-9	10-19	Malignant Systemic Neoplasms (Eye, Ear, Face, Head, and Neck)	2	Lifetime Cigarette Smoking History
F-2-10	10-28	Malignant Systemic Neoplasms (Prostate)	3	Degreasing Chemical Exposure
			4	Degreasing Chemical Exposure
			5	Degreasing Chemical Exposure
			6	Degreasing Chemical Exposure
F-2-11	10-38	Any Skin or Systemic Neoplasms	4	Eye Color
			5	Eye Color
			6	Eye Color
F-2-12	10-40	Prostate-Specific Antigen (Continuous)	1	Insecticide Exposure
			2	Age
			3	Insecticide Exposure
F-2-13	10-41	Prostate-Specific Antigen (Discrete)	1	Lifetime Cigarette Smoking History
			3	Insecticide Exposure
			4	Degreasing Chemical Exposure
			5	Degreasing Chemical Exposure
			6	Degreasing Chemical Exposure

Table F-2-1.
Interaction Table for Any Skin Neoplasms

a) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Skin Color: Table 10-3)				
Stratum	Current Dioxin Category Summary Statistics		Analysis Results for Log₂ (Current Dioxin + 1) Adjusted Relative Risk (95% C.I.)^a	
	Current Dioxin	n	Percent Yes	
Non-Peach	Low	60	36.7	0.74 (0.57,0.94) 0.016
	Medium	56	23.2	
	High	55	16.4	
Peach	Low	225	32.0	0.98 (0.89,1.08) 0.685
	Medium	211	36.0	
	High	224	30.4	

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Industrial Chemical Exposure: Table 10-3)				
Stratum	Current Dioxin Category Summary Statistics		Analysis Results for Log₂ (Current Dioxin + 1) Adjusted Relative Risk (95% C.I.)^a	
	Current Dioxin	n	Percent Yes	
No	Low	145	36.6	0.83 (0.71,0.97) 0.018
	Medium	122	31.2	
	High	89	20.2	
Yes	Low	140	29.3	1.01 (0.90,1.12) 0.928
	Medium	145	35.2	
	High	190	31.1	

Table F-2-1. (Continued)
Interaction Table for Any Skin Neoplasms

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Skin Color: Table 10-3)					
Current Dioxin Category Summary Statistics			Analysis Results for \log_2 (Current Dioxin + 1)		
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^a	p-Value
Non-Peach	Low	60	36.7	0.69 (0.53,0.89)	0.004
	Medium	56	23.2		
	High	55	16.4		
Peach	Low	224	32.1	0.91 (0.82,1.01)	0.091
	Medium	211	36.0		
	High	224	30.4		

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Industrial Chemical Exposure: Table 10-3)					
Current Dioxin Category Summary Statistics			Analysis Results for \log_2 (Current Dioxin + 1)		
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^a	p-Value
No	Low	145	36.6	0.78 (0.66,0.91)	0.002
	Medium	122	31.2		
	High	89	20.2		
Yes	Low	139	29.5	0.93 (0.83,1.05)	0.261
	Medium	145	35.2		
	High	190	31.1		

^a Relative risk for a twofold increase in current dioxin.

Note: Models 5 and 6: Low = ≤ 46 ppq; Medium = $> 46\text{--}128$ ppq; High = > 128 ppq.

Table F-2-2.
Interaction Table for Malignant Skin Neoplasms

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Dioxin-by-Insecticide Exposure: Table 10-4)					
Stratum	Initial Dioxin Category Summary Statistics			Analysis Results for Log ₂ (Initial Dioxin)	
	Initial Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^a	p-Value
No	Low	30	10.0	1.27 (0.84,1.93)	0.262
	Medium	34	8.8		
	High	41	17.1		
Yes	Low	120	18.3	0.64 (0.47,0.87)	0.004
	Medium	125	14.4		
	High	122	5.7		

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Industrial Chemical Exposure: Table 10-4)					
Stratum	Dioxin Category	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^b	p-Value
No	Comparison	407	11.3		
	Background RH	181	18.2	1.64 (0.99,2.72)	0.055
	Low RH	96	19.8	1.98 (1.06,3.69)	0.032
	High RH	75	4.0	0.36 (0.11,1.22)	0.102
	Low plus High RH	171	12.9	1.23 (0.69,2.17)	0.485
Yes	Comparison	577	12.1		
	Background RH	173	10.4	0.81 (0.46,1.44)	0.472
	Low RH	132	15.9	1.15 (0.66,2.00)	0.626
	High RH	169	10.1	0.97 (0.54,1.72)	0.910
	Low plus High RH	301	12.6	1.06 (0.68,1.64)	0.805

Table F-2-2. (Continued)
Interaction Table for Malignant Skin Neoplasms

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Insecticide Exposure: Table 10-4)					
Stratum	Dioxin Category	n	Percent Yes	Adjusted Relative Risk (95% C.I.)^b	p-Value
No	Comparison	369	9.2		
	Background RH	85	14.1	1.50 (0.72,3.12)	0.274
	Low RH	44	9.1	0.80 (0.26,2.46)	0.695
	High RH	61	14.8	2.02 (0.89,4.56)	0.093
	Low plus High RH	105	12.4	1.40 (0.69,2.83)	0.350
Yes	Comparison	615	13.3		
	Background RH	269	14.5	1.09 (0.71,1.68)	0.677
	Low RH	184	19.6	1.57 (0.99,2.47)	0.054
	High RH	183	6.0	0.51 (0.26,0.99)	0.047
	Low plus High RH	367	12.8	1.04 (0.70,1.56)	0.833

^a Relative risk for a twofold increase in initial dioxin.

^b Relative risk and confidence interval relative to Comparisons.

Note: Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

Model 3: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table F-2-3.
Interaction Table for Benign Skin Neoplasms

a) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Skin Color: Table 10-5)					
Current Dioxin Category Summary Statistics			Analysis Results for \log_2 (Current Dioxin + 1)		
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^a	p-Value
Non-Peach	Low	71	25.4	0.69 (0.53,0.89)	0.005
	Medium	78	18.0		
	High	69	8.7		
Peach	Low	227	19.4	0.97 (0.86,1.08)	0.555
	Medium	212	21.2		
	High	226	20.4		

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Skin Color: Table 10-5)					
Current Dioxin Category Summary Statistics			Analysis Results for \log_2 (Current Dioxin + 1)		
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^a	p-Value
Non-Peach	Low	71	25.4	0.66 (0.51,0.85)	0.002
	Medium	78	18.0		
	High	69	8.7		
Peach	Low	226	19.5	0.92 (0.82,1.04)	0.175
	Medium	212	21.2		
	High	226	20.4		

^a Relative risk for a twofold increase in current dioxin.

Note: Models 5 and 6: Low = ≤ 46 ppq; Medium = $> 46\text{--}128$ ppq; High = > 128 ppq.

Table F-2-4.
Interaction Table for Basal Cell Carcinoma (All Sites Combined)

a) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Asbestos Exposure: Table 10-7)					
Stratum	Current Dioxin Category Summary Statistics			Analysis Results for \log_2 (Current Dioxin + 1)	
	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^a	p-Value
No	Low	209	11.0	0.99 (0.84,1.17)	0.889
	Medium	195	14.4		
	High	199	9.1		
Yes	Low	73	15.1	0.69 (0.51,0.92)	0.011
	Medium	71	8.5		
	High	78	7.7		

^a Relative risk for a twofold increase in current dioxin.

Note: Model 6: Low = ≤ 46 ppq; Medium = $> 46\text{-}128$ ppq; High = > 128 ppq.

Table F-2-5.
Interaction Table for Basal Cell Carcinoma (Trunk)

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Insecticide Exposure: Table 10-9)					
Stratum	Dioxin Category	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^a	p-Value
No	Comparison	369	2.2		
	Background RH	85	0.0	--	--
	Low RH	44	4.6	2.10 (0.18,24.34)	0.553
	High RH	61	6.6	4.10 (0.44,38.34)	0.215
	Low plus High RH	105	5.7	3.07 (0.38,24.55)	0.289
Yes	Comparison	613	3.3		
	Background RH	269	4.1	0.73 (0.32,1.66)	0.452
	Low RH	184	4.9	1.02 (0.42,2.47)	0.974
	High RH	183	1.6	0.38 (0.10,1.42)	0.152
	Low plus High RH	367	3.3	0.73 (0.32,1.64)	0.444

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Insecticide Exposure: Table 10-9)					
Stratum	Current Dioxin Category Summary Statistics	n	Percent Yes	Analysis Results for Log ₂ (Current Dioxin + 1)	
	Current Dioxin			Adjusted Relative Risk (95% C.I.) ^b	p-Value
No	Low	72	0.0	1.71 (1.06,2.77)	0.028
	Medium	54	5.6		
	High	64	4.7		
Yes	Low	209	4.3	0.91 (0.66,1.26)	0.575
	Medium	215	4.2		
	High	215	2.3		

c) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Insecticide Exposure: Table 10-9)					
Stratum	Current Dioxin Category Summary Statistics	n	Percent Yes	Analysis Results for Log ₂ (Current Dioxin + 1)	
	Current Dioxin			Adjusted Relative Risk (95% C.I.) ^b	p-Value
No	Low	71	0.0	1.61 (1.05,2.49)	0.030
	Medium	53	5.7		
	High	67	4.5		
Yes	Low	214	4.7	0.89 (0.68,1.17)	0.416
	Medium	215	4.7		
	High	213	1.4		

Table F-2-5. (Continued)
Interaction Table for Basal Cell Carcinoma (Trunk)

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Insecticide Exposure: Table 10-9)				
Stratum	Current Dioxin Category Summary Statistics			Analysis Results for Log₂ (Current Dioxin + 1)
	Current Dioxin	n	Percent Yes	
No	Low	71	0.0	1.68 (1.07,2.63) 0.024
	Medium	53	5.7	
	High	67	4.5	
Yes	Low	213	4.7	0.91 (0.69,1.21) 0.538
	Medium	215	4.7	
	High	213	1.4	

^a Relative risk and confidence interval relative to Comparisons.

^b Relative risk for a twofold increase in current dioxin.

--: Adjusted relative risk, confidence interval, and p-value not presented due to zero abnormalities.

Note: Model 3: RH = Ranch Hand.

Comparison: Current Dioxin \leq 10 ppt.

Background (Ranch Hand): Current Dioxin \leq 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin \leq 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Model 4: Low = \leq 8.1 ppt; Medium = > 8.1-20.5 ppt; High = > 20.5 ppt.

Models 5 and 6: Low = \leq 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table F-2-6.
Interaction Table for Nonmelanoma

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Insecticide Exposure: Table 10-13)					
Stratum	Initial Dioxin Category Summary Statistics			Analysis Results for Log₂ (Initial Dioxin)	
	Initial Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.)^a	p-Value
No	Low	30	10.0	1.17 (0.76,1.83)	0.475
	Medium	34	8.8		
	High	41	12.2		
Yes	Low	120	17.5	0.65 (0.48,0.88)	0.006
	Medium	125	13.6		
	High	122	5.7		

^a Relative risk for a twofold increase in initial dioxin.

Note: Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

Table F-2-7.
Interaction Table for Malignant Systemic Neoplasms

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Lifetime Cigarette Smoking History: Table 10-16)					
Initial Dioxin Category Summary Statistics				Analysis Results for \log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^a	p-Value
0 Pack-years	Low	45	8.9	0.29 (0.07,1.17)	0.081
	Medium	38	2.6		
	High	53	0.0		
>0-10 Pack-years	Low	50	8.0	0.48 (0.19,1.19)	0.112
	Medium	44	2.3		
	High	66	1.5		
> 10 Pack-years	Low	75	5.3	0.96 (0.62,1.50)	0.872
	Medium	90	13.3		
	High	53	3.8		

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Degreasing Chemical Exposure: Table 10-16)					
Current Dioxin Category Summary Statistics				Analysis Results for \log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^b	p-Value
No	Low	152	2.0	1.51 (1.05,2.16)	0.026
	Medium	111	11.7		
	High	64	4.7		
Yes	Low	140	5.7	0.86 (0.63,1.18)	0.362
	Medium	185	6.0		
	High	233	2.6		

c) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Lifetime Cigarette Smoking History: Table 10-16)					
Current Dioxin Category Summary Statistics				Analysis Results for \log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^b	p-Value
0 Pack-years	Low	88	4.6	0.80 (0.48,1.33)	0.390
	Medium	80	6.3		
	High	77	1.3		
>0-10 Pack-years	Low	94	1.1	1.00 (0.61,1.63)	0.993
	Medium	75	6.7		
	High	100	1.0		
> 10 Pack-years	Low	115	7.8	1.22 (0.94,1.59)	0.144
	Medium	137	4.4		
	High	119	10.1		

Table F-2-7. (Continued)
Interaction Table for Malignant Systemic Neoplasms

d) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Degreasing Chemical Exposure: Table 10-16)					
Current Dioxin Category Summary Statistics				Analysis Results for \log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^b	p-Value
No	Low	147	3.4	1.43 (1.04,1.96)	0.030
	Medium	115	7.0		
	High	65	9.2		
Yes	Low	150	6.0	0.94 (0.73,1.20)	0.603
	Medium	177	4.5		
	High	231	3.5		

e) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Lifetime Cigarette Smoking History: Table 10-16)					
Current Dioxin Category Summary Statistics				Analysis Results for \log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^b	p-Value
0 Pack-years	Low	88	4.6	0.79 (0.47,1.33)	0.373
	Medium	80	6.3		
	High	77	1.3		
>0-10 Pack-years	Low	94	1.1	0.99 (0.60,1.62)	0.963
	Medium	75	6.7		
	High	100	1.0		
>10 Pack-years	Low	114	7.9	1.20 (0.90,1.59)	0.218
	Medium	137	4.4		
	High	119	10.1		

f) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Degreasing Chemical Exposure: Table 10-16)					
Current Dioxin Category Summary Statistics				Analysis Results for \log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^b	p-Value
No	Low	147	3.4	1.40 (1.00,1.96)	0.047
	Medium	115	7.0		
	High	65	9.2		
Yes	Low	149	6.0	0.91 (0.70,1.20)	0.511
	Medium	177	4.5		
	High	231	3.5		

^a Relative risk for a twofold increase in initial dioxin.

^b Relative risk for a twofold increase in current dioxin.

--: Adjusted relative risk, confidence interval, and p-value not presented due to zero abnormalities.

Note: Model 2: Low = 39.98 ppt; Medium = >98-232 ppt; High = >232 ppt.

Model 4: Low = ≤8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.

Models 5 and 6: Low = ≤46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table F-2-8.
Interaction Table for Systemic Neoplasms of Uncertain Behavior or Unspecified Nature

a) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Asbestos Exposure: Table 10-18)					
Current Dioxin Category Summary Statistics				Analysis Results for \log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^a	p-Value
No	Low	222	2.7	0.67 (0.42,1.09)	0.110
	Medium	209	1.4		
	High	216	0.9		
	Low	71	0.0	2.18 (1.02,4.65)	0.045
	Medium	87	1.2		
	High	81	2.5		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Asbestos Exposure: Table 10-18)					
Current Dioxin Category Summary Statistics				Analysis Results for \log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^a	p-Value
No	Low	221	2.3	0.75 (0.54,1.05)	0.092
	Medium	212	2.4		
	High	214	0.5		
	Low	77	0.0	1.98 (0.96,4.09)	0.064
	Medium	80	1.3		
	High	82	2.4		

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Asbestos Exposure: Table 10-18)					
Current Dioxin Category Summary Statistics				Analysis Results for \log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^a	p-Value
No	Low	221	2.3	0.72 (0.51,1.01)	0.058
	Medium	212	2.4		
	High	214	0.5		
	Low	76	0.0	1.93 (0.92,4.05)	0.080
	Medium	80	1.3		
	High	82	2.4		

^a Relative risk for a twofold increase in current dioxin.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = $> 8.1\text{-}20.5$ ppt; High = > 20.5 ppt.

Models 5 and 6: Low = ≤ 46 ppq; Medium = $> 46\text{-}128$ ppq; High = > 128 ppq.

Table F-2-9.
Interaction Table for Malignant Systemic Neoplasms (Eye, Ear, Face, Head, and Neck)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Lifetime Cigarette Smoking History: Table 10-19)					
Stratum	Initial Dioxin Category Summary Statistics			Analysis Results for \log_2 (Initial Dioxin)	
	Initial Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.)^a	p-Value
0 Pack-years	Low	45	2.2	0.12 (0.00,7.11)	0.309
	Medium	38	0.0		
	High	53	0.0		
>0-10 Pack-years	Low	50	4.0	0.12 (0.00,4.09)	0.236
	Medium	44	0.0		
	High	66	0.0		
>10 Pack-years	Low	75	1.3	1.24 (0.58,2.67)	0.576
	Medium	90	0.0		
	High	53	3.8		

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Lifetime Cigarette Smoking History: Table 10-19)					
Stratum	Dioxin Category	n	Percent Yes	Adjusted Relative Risk (95% C.I.)^b	p-Value
0 Pack-years	Comparison	281	0.0		
	Background RH	109	0.9	--	--
	Low RH	69	1.5	--	--
	High RH	67	0.0	--	--
	Low plus High RH	136	0.7	--	--
>0-10 Pack-years	Comparison	324	0.0		
	Background RH	109	0.0	--	--
	Low RH	67	3.0	--	0.029*
	High RH	93	0.0	--	--
	Low plus High RH	160	1.3	--	--
>10 Pack-years	Comparison	455	1.3		
	Background RH	153	1.3	0.98 (0.18,5.21)	0.982
	Low RH	119	0.8	0.50 (0.06,4.37)	0.534
	High RH	99	2.0	2.30 (0.23,23.29)	0.481
	Low plus High RH	218	1.4	1.06 (0.24,4.72)	0.936

Table F-2-9. (Continued)
Interaction Table for Malignant Systemic Neoplasms (Eye, Ear, Face, Head, and Neck)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Degreasing Chemical Exposure: Table 10-19)					
Stratum	Dioxin Category	n	Percent Yes	Adjusted Relative Risk (95% C.I.)^b	p-Value
No	Comparison	375	0.3		
	Background RH	181	0.6	2.14 (0.13,35.25)	0.595
	Low RH	94	4.3	15.44 (1.65,144.23)	0.016
	High RH	52	1.9	9.04 (0.53,155.09)	0.129
	Low plus High RH	146	3.4	13.63 (1.55,120.01)	0.019
Yes	Comparison	685	0.7		
	Background RH	190	1.1	1.67 (0.30,9.28)	0.556
	Low RH	161	0.0	--	--
	High RH	207	0.5	0.85 (0.10,7.51)	0.880
	Low plus High RH	368	0.3	0.34 (0.04,3.07)	0.340

^a Relative risk for a twofold increase in initial dioxin.

^b Relative risk and confidence interval relative to Comparisons.

--: Adjusted relative risk, confidence interval, and p-value not presented due to the sparse number of abnormalities.

* P-value given is based on continuity-adjusted chi-square statistic from unadjusted analysis.

Note: Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

Model 3: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table F-2-10.
Interaction Table for Malignant Systemic Neoplasms (Prostate)

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Degreasing Chemical Exposure: Table 10-28)					
Stratum	Dioxin Category	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^a	p-Value
No	Comparison	375	2.7		
	Background RH	181	0.0	--	--
	Low RH	94	4.3	0.92 (0.24,3.49)	0.907
	High RH	52	3.9	1.67 (0.30,9.45)	0.560
	Low plus High RH	146	4.1	1.09 (0.33,3.58)	0.889
Yes	Comparison	687	1.8		
	Background RH	191	2.6	1.24 (0.40,3.79)	0.708
	Low RH	161	1.2	0.37 (0.08,1.78)	0.213
	High RH	207	1.0	0.47 (0.10,2.26)	0.348
	Low plus High RH	368	1.1	0.41 (0.12,1.39)	0.152

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Degreasing Chemical Exposure: Table 10-28)					
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^b	p-Value
No	Low	152	0.0	1.95 (1.07,3.53)	0.029
	Medium	111	3.6		
	High	64	3.1		
Yes	Low	141	2.1	0.69 (0.40,1.19)	0.187
	Medium	185	2.2		
	High	233	0.9		

c) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Degreasing Chemical Exposure: Table 10-28)					
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.) ^b	p-Value
No	Low	147	0.0	1.85 (1.09,3.16)	0.024
	Medium	115	2.6		
	High	65	4.6		
Yes	Low	151	2.7	0.81 (0.54,1.20)	0.289
	Medium	177	1.1		
	High	231	1.3		

Table F-2-10. (Continued)
Interaction Table for Malignant Systemic Neoplasms (Prostate)

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Degreasing Chemical Exposure: Table 10-28)				
Stratum	Current Dioxin Category Summary Statistics			Analysis Results for Log₂ (Current Dioxin + 1)
	Current Dioxin	n	Percent Yes	
No	Low	147	0.0	1.74 (0.99,3.05) 0.053
	Medium	115	2.6	
	High	65	4.6	
Yes	Low	150	2.7	0.76 (0.49,1.16) 0.201
	Medium	177	1.1	
	High	231	1.3	

^a Relative risk and confidence interval relative to Comparisons.

^b Relative risk for a twofold increase in current dioxin.

--: Adjusted relative risk, confidence interval, and p-value not presented due to the sparse number of abnormalities.

Note: Model 3: RH = Ranch Hand.

Comparison: Current Dioxin \leq 10 ppt.

Background (Ranch Hand): Current Dioxin \leq 10 ppt.

Low (Ranch Hand): Current Dioxin $>$ 10 ppt, 10 ppt $<$ Initial Dioxin \leq 143 ppt.

High (Ranch Hand): Current Dioxin $>$ 10 ppt, Initial Dioxin $>$ 143 ppt.

Model 4: Low = \leq 8.1 ppt; Medium = > 8.1-20.5 ppt; High = > 20.5 ppt.

Models 5 and 6: Low = \leq 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table F-2-11.
Interaction Table for Any Skin or Systemic Neoplasms

a) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Eye Color: Table 10-38)				
Stratum	Current Dioxin Category Summary Statistics			Analysis Results for \log_2 (Current Dioxin + 1)
	Current Dioxin	n	Percent Yes	
Brown	Low	78	47.4	0.90 (0.76,1.06) 0.213
	Medium	97	41.2	
	High	110	31.8	
Hazel or Green	Low	81	40.7	1.24 (1.03,1.50) 0.022
	Medium	82	53.7	
	High	79	55.7	
Gray or Blue	Low	132	46.2	0.90 (0.77,1.04) 0.154
	Medium	108	51.9	
	High	106	34.9	

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Eye Color: Table 10-38)				
Stratum	Current Dioxin Category Summary Statistics			Analysis Results for \log_2 (Current Dioxin + 1)
	Current Dioxin	n	Percent Yes	
Brown	Low	81	49.4	0.90 (0.78,1.05) 0.180
	Medium	95	36.8	
	High	109	33.9	
Hazel or Green	Low	83	41.0	1.22 (1.04,1.43) 0.014
	Medium	83	50.6	
	High	76	59.2	
Gray or Blue	Low	132	46.2	0.94 (0.83,1.07) 0.385
	Medium	106	46.2	
	High	108	40.7	

Table F-2-11. (Continued)
Interaction Table for Any Skin or Systemic Neoplasms

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Eye Color: Table 10-38)				
Stratum	Current Dioxin Category Summary Statistics		Analysis Results for Log ₂ (Current Dioxin + 1) Adjusted Relative Risk (95% C.I.) ^a	
	Current Dioxin	n	Percent Yes	
Brown	Low	81	49.4	0.86 (0.74,1.00) 0.055
	Medium	95	36.8	
	High	109	33.9	
Hazel or Green	Low	82	41.5	1.16 (0.98,1.36) 0.087
	Medium	83	50.6	
	High	76	59.2	
Gray or Blue	Low	132	46.2	0.91 (0.80,1.04) 0.186
	Medium	106	46.2	
	High	108	40.7	

^a Relative risk for a twofold increase in current dioxin.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = $> 8.1\text{-}20.5$ ppt; High = > 20.5 ppt.

Models 5 and 6: Low = ≤ 46 ppq; Medium = $> 46\text{-}128$ ppq; High = > 128 ppq.

Table F-2-12.
Interaction Table for Prostate-Specific Antigen (ng/ml)
(Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Insecticide Exposure: Table 10-40)						
Stratum	Occupational Category	Group	n	Adjusted Mean ^a	Difference of Adjusted Means (95% C.I.) ^b	p-Value ^c
<i>No</i>	<i>All</i>	<i>Ranch Hand</i>	213	0.943	-0.161 --	0.012
		<i>Comparison</i>	455	1.104		
<i>Yes</i>	<i>All</i>	<i>Ranch Hand</i>	687	1.087	0.063 --	0.152
		<i>Comparison</i>	768	1.024		
<i>No</i>	Officer	Ranch Hand	79	0.934	-0.258 --	0.018
		Comparison	160	1.192		
	Enlisted Flyer	Ranch Hand	30	1.052	-0.157 --	0.386
		Comparison	77	1.208		
	Enlisted Groundcrew	Ranch Hand	104	0.899	-0.093 --	0.268
		Comparison	218	0.992		
<i>Yes</i>	Officer	Ranch Hand	269	1.225	0.118 --	0.101
		Comparison	316	1.107		
	Enlisted Flyer	Ranch Hand	121	1.157	0.047 --	0.668
		Comparison	121	1.111		
	Enlisted Groundcrew	Ranch Hand	297	0.921	0.022 --	0.690
		Comparison	331	0.900		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Age: Table 10-40)						
Initial Dioxin Category Summary Statistics				Analysis Results for Log ₂ (Initial Dioxin)		
Stratum	Initial Dioxin	n	Adjusted Mean ^a	Adjusted Slope (Std. Error) ^d	p-Value	
Born ≥ 1942	Low	54	0.776	0.002 (0.037)	0.949	
	Medium	71	0.664			
	High	108	0.781			
Born < 1942	Low	113	1.267	-0.094 (0.039)	0.016	
	Medium	95	1.072			
	High	60	0.898			

Table F-2-12. (Continued)
Interaction Table for Prostate-Specific Antigen (ng/ml)
(Continuous)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Insecticide Exposure: Table 10-40)					
Stratum	Dioxin Category	n	Adjusted Mean ^a	Differences of Adjusted Means vs. Comparisons (95% C.I.) ^b	
					p-Value ^c
No	Comparison	379	1.099		
	Background RH	89	0.833	-0.266 --	0.001
	Low RH	47	0.939	-0.160 --	0.157
	High RH	66	0.962	-0.137 --	0.165
	Low plus High RH	113	0.951	-0.148 --	0.062
Yes	Comparison	635	1.009		
	Background RH	267	1.036	0.027 --	0.612
	Low RH	197	1.095	0.087 --	0.159
	High RH	179	1.004	-0.005 --	0.939
	Low plus High RH	376	1.050	0.041 --	0.408

^a Transformed from natural logarithm scale.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

^d Slope and standard error based on natural logarithm of prostate-specific antigen versus \log_2 initial dioxin.

Note: Analysis based on measurements at or above 0.2 ng/ml (sensitivity limit) only.

Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

Model 3: RH = Ranch Hand.

Comparison: Current Dioxin \leq 10 ppt.

Background (Ranch Hand): Current Dioxin \leq 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin \leq 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table F-2-13.
Interaction Table for Prostate-Specific Antigen
(Discrete)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Lifetime Cigarette Smoking History: Table 10-41)						
Stratum	Occupational Category	Group	n	Percent Abnormal	Adj. Relative Risk (95% C.I.)	p-Value
0 Pack-years	All	<i>Ranch Hand</i>	254	3.9	0.85 (0.37,1.96)	0.706
		<i>Comparison</i>	353	4.8		
>0-10 Pack-years	All	<i>Ranch Hand</i>	296	4.7	1.16 (0.55,2.44)	0.691
		<i>Comparison</i>	384	5.0		
>10 Pack-years	All	<i>Ranch Hand</i>	392	2.3	0.47 (0.21,1.07)	0.073
		<i>Comparison</i>	540	4.8		
0 Pack-years	Officer	Ranch Hand	131	4.6	0.97 (0.40,2.35)	0.944
		Comparison	194	5.7		
	Enlisted Flyer	Ranch Hand	25	4.0	0.84 (0.23,3.04)	0.790
		Comparison	27	3.7		
	Enlisted Groundcrew	Ranch Hand	98	3.1	0.53 (0.16,1.80)	0.311
		Comparison	132	3.8		
>0-10 Pack-years	Officer	Ranch Hand	95	7.4	1.43 (0.57,3.61)	0.443
		Comparison	142	7.0		
	Enlisted Flyer	Ranch Hand	52	5.8	1.24 (0.42,3.70)	0.696
		Comparison	61	8.2		
	Enlisted Groundcrew	Ranch Hand	149	2.7	0.79 (0.28,2.27)	0.663
		Comparison	181	2.2		
>10 Pack-years	Officer	Ranch Hand	134	3.0	0.58 (0.22,1.53)	0.271
		Comparison	166	4.8		
	Enlisted Flyer	Ranch Hand	83	4.8	0.50 (0.16,1.59)	0.240
		Comparison	114	7.0		
	Enlisted Groundcrew	Ranch Hand	175	0.6	0.32 (0.10,1.00)	0.049
		Comparison	260	3.9		

Table F-2-13. (Continued)
Interaction Table for Prostate-Specific Antigen
(Discrete)

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Insecticide Exposure: Table 10-41)					
Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)^a	p-Value
No	Comparison	391	6.7		
	Background RH	90	1.1	0.07 (0.01,0.60)	0.015
	Low RH	48	2.1	0.14 (0.02,1.15)	0.066
	High RH	67	7.5	0.81 (0.26,2.54)	0.712
Yes	Comparison	653	4.0		
	Background RH	275	2.6	0.47 (0.19,1.15)	0.100
	Low RH	202	6.4	1.23 (0.58,2.59)	0.593
	High RH	185	2.2	0.63 (0.21,1.92)	0.414
	Low plus High RH	387	4.4	1.01 (0.51,1.98)	0.986

c) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Degreasing Chemical Exposure: Table 10-41)					
Stratum	Current Dioxin Category Summary Statistics			Analysis Results for Log₂ (Current Dioxin + 1)	
	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)^b	p-Value
No	Low	152	0.7	1.65 (1.04,2.61)	0.033
	Medium	111	7.2		
	High	64	4.7		
Yes	Low	140	2.1	0.88 (0.61,1.26)	0.492
	Medium	185	6.5		
	High	233	2.2		

Table F-2-13. (Continued)
Interaction Table for Prostate-Specific Antigen
(Discrete)

d) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Degreasing Chemical Exposure: Table 10-41)					
Stratum	Current Dioxin Category Summary Statistics			Analysis Results for \log_2 (Current Dioxin + 1)	
	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)^b	p-Value
No	Low	147	0.7	1.68 (1.13,2.52)	0.011
	Medium	115	5.2		
	High	65	7.7		
	Low	150	2.7	0.91 (0.66,1.24)	0.550
	Medium	177	5.1		
	High	231	3.0		

e) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Degreasing Chemical Exposure: Table 10-41)					
Stratum	Current Dioxin Category Summary Statistics			Analysis Results for \log_2 (Current Dioxin + 1)	
	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)^b	p-Value
No	Low	147	0.7	1.61 (1.06,2.44)	0.025
	Medium	115	5.2		
	High	65	7.7		
	Low	149	2.7	0.87 (0.62,1.22)	0.411
	Medium	177	5.1		
	High	231	3.0		

^a Relative risk and confidence interval relative to Comparisons.

^b Relative risk for a twofold increase in current dioxin.

Note: Model 3: RH = Ranch Hand.

Comparison: Current Dioxin \leq 10 ppt.

Background (Ranch Hand): Current Dioxin \leq 10 ppt.

Low (Ranch Hand): Current Dioxin $>$ 10 ppt, 10 ppt $<$ Initial Dioxin \leq 143 ppt.

High (Ranch Hand): Current Dioxin $>$ 10 ppt, Initial Dioxin $>$ 143 ppt.

Model 4: Low = \leq 8.1 ppt; Medium = $>$ 8.1-20.5 ppt; High = $>$ 20.5 ppt.

Models 5 and 6: Low = \leq 46 ppq; Medium = $>$ 46-128 ppq; High = $>$ 128 ppq.